

REMARKS/ARGUMENTS

Specification

The abstract has been amended to be a single paragraph.

Claims

35 USC § 102(b) Rejection of Claims 1, 3 and 4

The Office Action rejected Claims 1, 3, and 4 under 35 USC § 102(b) as being anticipated by Sisson et al. [3,568,206].

The applicant disagrees with the conclusion in the Office Action that Sisson '206 anticipates Claims 1, 3, and 4 in the present application. Sisson '206 relates to an annular slot antenna loaded with a transmission line. At Column 1, lines 4 – 9, it states “the present invention relates to antennas, and more particularly, to a miniature transmission line loaded slot antenna. Conventional annular slot antennas are approximately one-half wavelength in diameter. It is an object of the present invention to provide a similar antenna having a diameter of only approximately 0.05 wavelength.”

Additionally, at Column 1, lines 18 - 32, it states “referring first to Figures 1 and 2, a substantially square metal cavity 1 is provided, having a bottom surface 2, sides 4, and upper surfaces 5. A conductive probe 6 is electrically connected to the bottom surface 2 and projects upwardly to the plane to upper surfaces 5. The center of a spiral conductor 7 is connected to the upper end of probe 6. The spiral conductor 7 is wound in the plane of the upper surfaces 5 of the cavity, and an annular space S acting as a slot is left between the outer spiral turns and the cavity sides 4. The diameter D of slot S is only approximately 0.05 wavelength. The diameter D is nominally either the outside diameter of the slot or the longest side of a rectangular slot when the slot has square corners. It is the same as the diameter of the cavity from sidewall to sidewall.”

When the description indicated above is considered, it appears that Sisson '206 relates to a cavity resonator because it is one-half wavelength in diameter. Furthermore, the antenna described in Sisson '06 is an annular slot antenna loaded with an annular slot in a cavity resonator, and the cavity does not function as a reflector. In addition, the diameter “D” of slot “S” is 0.05 wavelength, and the diameter “D” is not the width of the slot “S” but the diameter of

the cavity, which is clearly shown in Figure 2. Thus, Sisson '206 does not teach that a space between a spiral conductor 7 and the cavity is 0.05 wavelength.

The antenna described in Sisson '206 has a completely different function in its operation than the present invention. Thus, the antenna in Sisson '206 does not anticipate the antenna in the present application.

Each claim is discussed in detail below.

Claim 1

The Office Action stated “regarding claim 1, Sisson et al. teaches in Figures 1 - 3 a planar antenna fitted with a reflector [1] comprising: a radiator [7]; and a reflector of planar form [2] whereof both side sections [4], arranged to the rear of and facing towards the radiator with only a prescribed separation (D) (See Fig. 1 - 2), are bent towards the radiator, wherein λ is the wavelength of the central frequency of the operating frequency band, characterized in that the prescribed separation (D) of the radiator and the reflector has a range from 0.06λ to 0.15λ (Examiner Note: It is inherent to have a range from 0.06λ to 0.15λ because workable ranges involves only routine skill in the art), and the separation between the leading edges of two side sections [S] in the reflector and the radiator is not greater than 0.06λ (See col. 1, lines 24 - 32).”

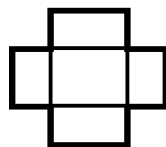
The applicant disagrees with the determination in the Office Action of the equivalent features between Sisson '206 and the present application. Referring to Figures 1 and 2 of Sisson '206, and Figures 2 and 3 of the present application, the table below shows the correct correlation of the equivalent features between the two documents.

Sisson '206		Present Application
D	\approx	L2 or H2
7	\approx	10
2	\approx	11a
S	\approx	α
4	\approx	11
Not Measured	\neq	D or L3
5	\neq	Not Present

The Office Action incorrectly stated that “D” in Sisson ‘206 is the same as “D” in the present application. Figure 2 of Sisson ‘206 shows that “D” is the “diameter (width or length) between sides “4”, which is equivalent to “L2” or “H2” in the present application. However, as can be seen in Figure 3 of the present application, “D” is the distance between the face of the reflector (Feature 11a) and the radiator (Feature 10), which is not measured in Sisson ‘206. The Office Action cited Column 1, lines 24 – 32 in Sisson ‘206 to show that “S” is not greater than 0.06λ ; however a careful reading of this section shows that Sisson ‘206 states “The diameter D of slot S is only approximately 0.05 wavelength. The diameter D is nominally either the outside diameter of the slot when the latter is round or the longest side of a rectangular slot when the slot has square corners.” Thus, it is not “S” that is 0.05λ but “D” that is 0.05λ , which is equivalent to “L2” or “H2”, and not “D” in the present application.

Additionally, the Office Action incorrectly stated that Feature 4 in Sisson ‘206 is equivalent to Feature 11b in the present application. At page 11, second paragraph in the present application, it states “The reflector 11 is formed by bending both sides of a rectangular metallic plate substantially at right-angles so as to face each other; as shown in FIG. 1 and FIG. 3, the reflector 11 comprises a front face section 11a facing the radiator 10 and side sections 11b formed by bending towards the radiator 10 on both sides of the front face section 11a.” [Emphasis added]

Ignoring for now Feature 5 in Sisson ‘206, the “cavity” is composed of a bottom (Feature 2) and four sides (Feature 4), which cannot be made by “bending both sides of a rectangular metallic plate substantially at right-angles so as to face each other”. When the cavity is unfolded to show the original configuration, the “metallic plate” has a “fat cross” shape and not a “rectangular” shape.



Sisson ‘206



Present application

The Examiner is requested to remove Sisson '206 as a 102(b) Prior Art reference since it does not contain each and every feature in Claim 1, at least one of which is “bending both sides of a rectangular metallic plate substantially at right-angles so as to face each other”. In light of the foregoing arguments, the Examiner is respectfully requested to allow Claim 1.

Claim 3

The Office Action stated “regarding claim 3, Sisson et al. teaches in Figures 1 - 3 the planar antenna fitted with a reflector [1] according to claim 1, characterized in that the radiator [7] is a loop.”

The Applicant disagrees with the assessment in the Office Action that Feature 1 in Sisson '206, which is described as “a substantially square metal cavity”, is equivalent to the reflector (Feature 11a) in the present application. As discussed above, the “square metal cavity” (Feature 1) in Sisson '206 does not serve the same function as the reflector (Feature 11a) in the present application, nor is it the same configuration.

The Examiner is requested to remove Sisson '206 as a 102(b) Prior Art reference since it does not contain each and every feature in Claim 3, at least one of which is “bending both sides of a rectangular metallic plate substantially at right-angles so as to face each other”. In light of the foregoing arguments, the Examiner is respectfully requested to allow Claim 3.

Claim 4

The Office Action stated “regarding claim 4, Sisson '206 teaches in Figures 1 - 3 the planar antenna fitted with a reflector [1] according to claim 1, characterized in that the reflector [1] is formed whereof a front face section facing towards the radiator [7], and bent sections [4] thereof are bent an obtuse angle (See Fig. 1) at the two of the front face section is arranged to face towards the radiator, the two side edges [4] thereof are bent to cross almost rectangularly against the front face section of the leading edge of the bent sections are arranged.”

The applicant disagrees with the conclusion in the Office Action that Sisson '206 discloses all the features in Claim 4, specifically the feature “bent an obtuse angle at the two side sections of said front face section is arranged to face towards said radiator”. The Office Action referred to Figure 1 in Sisson '206 as showing “bent an obtuse angle”. A careful examination of Figure 1 shows that none of the angles are “obtuse”. The term “obtuse” has a clear and concise

meaning in geometry. An obtuse angle is “an angle exceeding 90 degrees but less than 180 degrees” (Merriam-Webster Online Dictionary). The “square metal cavity” in Figure 1 of Sisson ‘206 is described as a “rectangular slot when the slot has square corners”. The terms “square corner” and “rectangular” refer to corners of 90°. The definition of an obtuse angle excludes angles of 90°. Figures 24 and 25 in the present application show an example of an obtuse angle.

The Examiner is requested to remove Sisson ‘206 as a 102(b) Prior Art reference since it does not contain each and every feature in Claim 4, at least one of which is “bent an obtuse angle”. In light of the foregoing arguments, the Examiner is respectfully requested to allow Claim 4.

35 USC § 103(a) Rejection of Claims 6, 8, and 9

Claims 6, 8, and 9

The Office Action rejected Claims 6, 8, and 9 under 35 USC § 103(a) as being unpatentable over Sisson et al. [3,568,2006] in view of Jeong-Kun et al. [6,606,067]

The Office Action stated “Sisson et al. teaches every feature of the claimed invention in paragraph 3 except for a double loop element wherein the width of the upper and lower sides is formed wider than that of the other sides. Jeong-Kun et al. teaches in figures 4 - 5 a double loop element [40] wherein the width of the upper and lower sides is formed wider than that of the other sides. In view of the above statement, it would have been obvious to one having ordinary skill in the art at the time the invention made by using a delta slot radiation element as taught by Jeong-Kun et al. in order to have low Q and it is possible to obtain a wide bandwidth (See col. 5, lines 16-22).”

The applicant disagrees with the conclusion in the Office Action that Sisson ‘206 anticipates Claims 6, 8, and 9 in the present application. As discussed above, Sisson ‘206 does not contain each and every feature in the claims.

The Office Action cited Jeong-Kun ‘067 as showing the features not disclosed by Sisson ‘206. However, a careful reading of Jeong-Kun ‘067 shows that it does not disclose the missing features omitted by Sisson ‘206. Thus, the combination of Sisson ‘206 and Jeong-Kun ‘067 does not disclose each and every feature in Claims 6, 8, and 9.

In addition to the features discussed above for Claim 1, 3, and 4, neither cited reference alone or in combination discloses “the said prescribed separation (D) of said radiator and said reflector has a range from about 0.06λ to 0.15λ , and the separation between the leading edges of two side sections in said reflector and said radiator is not greater than 0.06λ ”.

The applicant is able to obtain effective results by setting the range of the prescribed separation (D) approximately from 0.06λ to 0.15λ . At page 14, line 19 in the present application, it states “While the electrical characteristic tends to deteriorate as the separation D2 of the radiator 20 and the reflector 21 is decreased, a fully satisfactory electrical characteristic for a planar antenna 2 fitted with a reflector can be obtained if the separation D2 between the radiator 20 and the reflector 21 is made about 30mm”.

The Examiner is requested to remove Sisson ‘206 and Jeong-Kun ‘067 as 103(a) Prior Art references since they do not contain, alone or in combination, each and every feature in Claims 6, 8, and 9. At least one of which is “separation between the leading edges of two side sections in said reflector and said radiator is not greater than 0.06λ ” in Independent Claim 6. In light of the foregoing arguments, the Examiner is respectfully requested to allow Claims 6, 8, and 9.

Conclusion

Claims 1, 3, 4, 6, 8 and 9 are Pending. Claims 3 and 8 are Original. Claims 1, 4, 6, and 9 have been Previously presented. Claims 2, 5, 7, and 10 are Canceled. None of the claims are Currently amended.

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, arguments in support of the patentability of the pending claim set are presented above. In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested and it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

No fees are believed due; however, please charge any additional fees, including any fees for additional extension of time, or credit overpayment to credit card information.

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